

What is claimed is:

1. A cleaner for conveyor belts comprising:
  - a scraper blade for engaging against a conveyor belt running in a downstream travel direction;
  - a blade mount member that resiliently keeps the blade engaged against the belt;
  - a layback portion of the mount member having an upper end to which the scraper blade is secured and extending at a predetermined layback angle toward the belt; and
  - a lower arcuate portion of the mount member spaced upstream of the upper end of the layback portion with the lower arcuate portion flexing during conveyor belt operations for controlled deflections of the layback portion that reduces loading on the scraper blade and substantially keeps the scraper blade engaged against the belt as the belt is running.
2. The conveyor belt cleaner of claim 1 wherein the lower arcuate portion has a predetermined radius of curvature that decreases when flexed to reduce stress on the blade mount member during flexing thereof.
3. The conveyor belt cleaner of claim 1 wherein the layback portion has a flat upper surface, and the predetermined layback angle minimizes material build-up on the flat upper surface of the layback portion during conveyor belt operations.
4. The conveyor belt cleaner of claim 1 wherein the blade mount member includes a resilient base assembly connected to the arcuate portion for cushioning the member against impacts on the blade and minimizing chattering thereof.

5. The conveyor belt cleaner of claim 4 wherein the resilient base assembly comprises a flat base portion integrally connected to the arcuate portion and extending rearwardly therefrom generally in the belt travel direction, and  
a layer of resilient material secured beneath the flat base portion for damping vibrations of the blade during conveyor belt operations.
6. The conveyor belt cleaner of claim 1 wherein the blade mount member is of a unitary construction.
7. The conveyor belt cleaner of claim 6 wherein the blade mount member is of metal material for use in high temperature environments, the metal layback portion has a flat configuration, and  
a metal base portion extending rearwardly from the metal arcuate portion generally in the belt travel direction with the layback angle formed between the layback portion and the base portion such that the layback portion pivots toward and away from the base portion with flexing of the arcuate portion during conveyor belt operations.
8. The conveyor belt cleaner of claim 1 wherein the scraper blade includes a tip of hard material for engaging the belt.
9. The conveyor belt cleaner of claim 1 wherein a plurality of the blade mount members and scraper blades are provided for extending across the conveyor belt to be cleaned.

10. The conveyor belt cleaner of claim 1 wherein the layback portion includes an upturned end portion at the upper end thereof to which the scraper blade is secured with the upturned end portion extending substantially normal to the conveyor belt for providing the scraper blade with an optimized angle of contact with the belt.
11. A conveyor belt cleaning assembly for high temperature conveyor belt operations, the conveyor belt cleaning assembly comprising:
  - a frame;
  - a scraper blade for engaging a conveyor belt;
  - a rigid support of the frame; and
  - a resilient blade mount of a shape-retentive metal material secured to the support and being configured for resiliently biasing the scraper blade into engagement with the conveyor belt running in high temperature environments.
12. The conveyor belt cleaning assembly of claim 11 wherein the metal blade mount is of a unitary, angled spring plate construction.
13. The conveyor belt cleaning assembly of claim 11 wherein the metal blade mount includes a layback portion extending toward a surface of the conveyor belt with which the blade is engaged and a base portion extending at a predetermined layback angle to the layback portion that minimizes material build up on the layback portion and allows the blade to pivot back and away from the belt and down toward the base portion during conveyor belt operations.
14. The conveyor belt cleaning assembly of claim 13 wherein the metal blade mount includes an upper portion extending vertically upward from the layback portion substantially normal to the belt.

15. The conveyor belt cleaning assembly of 11 including a resilient material fixed between the metal blade mount and the support for cushioning and minimizing chattering of the blade during conveyor belt operations.
16. The conveyor belt cleaning assembly of claim 15 wherein the resilient material is operable at temperatures up to approximately 450 degrees Fahrenheit.
17. The conveyor belt cleaning assembly of claim 11 wherein the blade mount includes a resilient pivot portion and a layback portion extending upwardly and rearwardly from the pivot portion toward the belt generally along a direction of travel thereof, and the blade is fixed to the layback portion to extend in the same direction as the layback portion and into engagement with the belt.
18. The conveyor belt cleaning assembly of claim 11 wherein the rigid support includes adjustment mechanisms that allow rotary and linear shifting of the blade mount for changing an angle of attack of the blade relative to the belt and engagement force of the blade with the belt.
19. A cleaning blade mount comprising:
  - an upper layback portion extending toward a conveyor belt and having a cleaning blade secured thereto;
  - a lower base portion for securing the mount to a support therefor; and
  - an intermediate arcuate portion interconnecting the layback and base portions and having a variable radius of curvature to allow shifting of the layback portion relative to the base portion during conveyor belt operations.

20. The cleaning blade mount of claim 19 wherein the layback portion is maximized in length, and the layback portion and base portion define a predetermined acute angle therebetween selected for maximum vertical displacement of the blade with a minimum of horizontal displacement and minimizing accumulation of material scraped off the belt on the layback portion.

21. The cleaning blade mount of claim 19 wherein the layback, base and arcuate portions are of a unitary construction.

22. The cleaning blade mount of claim 19 wherein the conveyor belt travels about a head pulley, the layback, arcuate and base portions are of an angled metal plate construction,

resilient material between the base portion and support for cushioning the blade extending into engagement with the belt traveling about the head pulley.

23. A belt cleaning system comprising:

a cleaning blade for being biased into scraping engagement with a conveyor belt:

a first resilient mount for the cleaning blade that allows the blade to shift away from the belt;

a second resilient mount secured to the first mount that allows the blade to shift away from the belt;

a third resilient mount operably secured to the first and second resilient mounts for allowing the blade to shift away from the belt; and

a fourth resilient mount secured to the third mount that allows the blade to shift away from the belt with the resilient mounts cooperating to provide four distinct mounts that absorb energy of impacts on the blade during conveyor belt operation with the blade shifting away from the belt, and provide for controlled

release of the impact energy to minimize impact force of the blade against the belt.

24. The belt cleaning system of claim 23 wherein the cleaning blade and the first and second resilient mounts comprise a plurality of cleaning blades and associated first and second resilient mounts extending across the conveyor belt.

25. The belt cleaning system of claim 23 including an elongate support extending across the conveyor belt and including opposite ends at which the third and fourth resilient mounts are disposed.

26. The belt cleaning system of claim 23 wherein the cleaning blade is directly secured to the first resilient mount which is directly secured to the second resilient mount, and

an elongate support extending across the conveyor belt and including opposite ends with the second resilient mount directly secured to the support intermediate the ends thereof, and the third and fourth resilient mounts disposed at the ends of the support.

27. The belt cleaning system of claim 26 wherein the third and fourth resilient mounts are operably secured to the support ends to allow the support to resilient shift along with the second resilient mount and the first resilient mount secured thereto.

28. The belt cleaning system of claim 23 wherein the first resilient mount comprises a spring plate having an upper end to which the cleaning blade is attached.

29. The belt cleaning system of claim 23 wherein the second resilient mount comprises a torsion bias mechanism.

30. The belt cleaning system of claim 25 wherein the third resilient mount comprises a torsion bias mechanism allowing for resilient rotary shifting of the support and the fourth resilient mount comprises a vertical bias mechanism allowing for resilient vertical shifting of the support.

31. The belt cleaning system of claim 23 wherein the first resilient mount comprises a spring plate to which the cleaning blade is attached and the second resilient mount comprises a torsion bias mechanism including an outer member and an inner member fixed relative to the outer member and extending therein and resilient material disposed between the inner and outer members for allowing resilient shifting of the outer member with the spring plate being attached to the outer member.

32. The belt cleaning system of claim 31 wherein the first and second resilient mounts include a stop therebetween to limit shifting of the spring plate relative to the outer member of the torsion bias mechanism.

33. The belt cleaning system of claim 23 wherein the cleaning blade is a distinct member from the first resilient mount.

34. A secondary belt cleaning system for cleaning a conveyor belt running in a belt travel direction between conveyor pulleys, the secondary belt cleaner system comprising:

an elongate support having opposite ends and extending under the conveyor belt transverse to the belt travel direction;

a plurality of side-by-side aligned cleaning blades biased into scraping engagement with the belt;

a pair of resilient mounts for each of the cleaning blades disposed under the belt operably secured to the support with the resilient mounts allowing the blade to shift horizontally in the belt travel direction and vertically down away from the belt due to impacts therewith during conveyor belt operations; and

resilient biasing mechanisms at the ends of the support out from under the conveyor belt that allows for both rotary and vertical resilient shifting of the support.

35. The secondary belt cleaning system of claim 34 wherein the pair of resilient mounts include an angled spring plate member having a layback portion including an upper end to which the cleaning blade is secured and extending at a predetermined layback angle toward the belt, and a torsion bias mechanism to which the spring plate member is mounted allowing the spring plate member to resiliently rotate about an axis substantially parallel to the elongate support.

36. The secondary belt cleaning system of claim 35 wherein the torsion bias mechanism is disposed behind the layback portion so that the layback portion serves to protect the torsion bias mechanism from scrapped material from the belt.

37. The secondary belt cleaning system of claim 35 wherein the torsion biasing mechanism includes an inner member, an outer sleeve extending about the inner member and resilient material between the sleeve and the inner member to allow the sleeve to resiliently rotate about the inner member, and the angled spring plate member comprises a lower arcuate portion spaced upstream of the upper end of the layback portion and a flat base portion connected to the arcuate portion and secured to the outer sleeve.



38. The secondary belt cleaning system of claim 37 including a stop between the layback portion and the outer sleeve to limit deflection of the layback portion and for causing resilient rotation of the sleeve.

39. The secondary belt cleaning system of claim 34 wherein the pair of resilient mounts include a stop therebetween so that one of the mounts is limited in an amount of resilient shifting provided to the blade thereby so that only the other mount of the pair generates resilient shifting of the blade.

40. The secondary belt cleaning system of claim 34 wherein the resilient biasing mechanisms comprise a pair of biasing mechanisms at each end of the support with one biasing mechanism allowing for the rotary resilient shifting of the support and the other biasing mechanism allowing for the vertical resilient shifting of the support.

41. The secondary belt cleaning system of claim 34 wherein the resilient mounts and biasing mechanisms permit the belt to travel in an opposite direction to the belt travel direction while substantially keeping the cleaning blades biased into scraping engagement therewith.